

September 26, 2005
54.24614.0001

Ms. Vicki Jones
Stanislaus County
Department of Environmental Resources
3800 Cornucopia Way, Suite C
Modesto, CA 95358-9492

Subject: Workplan for Subsurface Investigation at 2006 L Street, Newman, California

Dear Ms. Jones:

ATC Associates Inc. (ATC) has prepared this workplan, on behalf of Mr. William Cerutti, the former GC&SP Trucking facility located at 2006 L Street in Newman, California. The purpose of the subsurface investigation is to evaluate the lateral extent of impacted soil and groundwater, if any, at the facility. This work is being done at the request of the Stanislaus County Department of Environmental Resources (SCDER) in their letter dated January 17, 2003.

The scope of work includes advancing five Geoprobe® soil borings; analyses of selected soil and groundwater samples; performing a receptor survey; and preparing an investigation report detailing site activities. The scope of work is described in detail in the following paragraphs.

SITE LOCATION

The site is located west of L Street and south of Inyo Avenue in Newman, California, as shown on Figure 1. The location is a commercial and industrial area with residential properties to the northeast. The site is currently occupied by a welding shop.

BACKGROUND

In approximately 1993, a site observation well was installed at the site. The well is about twelve feet in depth and twelve inches in diameter made of PVC plastic. Currently the well is dry.

In March 1994, two underground storage tanks (USTs) were removed from the site. The tanks were reported to have stored diesel fuel. A total of five soil samples were collected from the soil surrounding and beneath the tanks. Total petroleum hydrocarbons as diesel (TPHd), toluene, ethyl benzene, and xylenes were detected in a soil samples collected near the southern portion of the UST excavation area (Figure 2).

From May 17 to June 15, 1994, additional soil was excavated south of the USTs. A total of three soil samples and one groundwater sample were collected from the additional excavation pit.

TPHd was detected in the soil sample collected from the southwall of the additional excavation pit.

There is a site well installed

SCOPE OF WORK

Planning and Permits

ATC will obtain the necessary SCDER permits for the advancement of five soil borings. ATC will schedule field personnel and equipment, notify Underground Services Alert to locate underground utilities as required, and perform other necessary field preparation and job start-up activities.

Installation of On-Site Geoprobe Soil Borings

To evaluate the presence of impacted soil and groundwater at the site, five Geoprobe® soil borings will be advanced to first encountered groundwater, estimated at approximately 25 feet below ground surface (bgs). Proposed boring locations are shown on Figure 2.

The five borings will be advanced using truck mounted Geoprobe® narrow diameter, direct push technology. Drilling will be conducted by a State-licensed (C57) drilling company. A field geologist will be present to log soil samples. Descriptions of soil types encountered and sample collection intervals will be recorded on boring logs. Soil samples will be collected continuously, field screened with a Photoionization Detection (PID) meter, and an estimated two soil samples from each of the borings will be submitted for laboratory analyses. Soil sample selection will be based on PID measurements and field observations (i.e. odor and soil discoloration).

One groundwater sample will be collected from each boring at the depth groundwater is first encountered, anticipated to be approximately 25 feet bgs. Once each of the Geoprobe® soil borings have been advanced to approximately one foot below first encountered groundwater, the depth to water will be gauged using a solinist depth to water indicator. A disposable bailor will then be inserted into the soil boring to collect the groundwater sample.

Following soil and groundwater sample collection, the borings will be backfilled with neat cement grout to the ground surface. Drill cuttings, if any, will be stored on site in a 5-gallon container pending laboratory results.

Sample Analysis

The soil and groundwater samples from the Geoprobe® soil borings will be immediately placed in a cooler with ice and delivered under chain-of-custody documentation to a State-certified analytical laboratory. Soil and groundwater samples will be analyzed for total petroleum hydrocarbons as gasoline (TPHg) and TPHd by EPA method 8015M and benzene, toluene, ethylbenzene, and xylenes (BTEX), methyl tertiary butyl ether (MTBE), 1,2-dichloroethane (1,2-DCA), ethyl dibromide (EDB), tertiary butyl alcohol (TBA), tertiary amyl ether (TAME), diisopropyl ether (DIPE), and ethyl tertiary butyl ether (ETBE) by EPA method 8260B.

Sensitive Receptor Survey

ATC will perform a sensitive receptor survey for the site. ATC will review Department of Water Resources (DWR) groundwater well construction logs to identify groundwater wells located within a 2,000-foot radius of the site. ATC will contact the City of Newman Public Works Department to identify municipal drinking water wells located within a 2,000-foot radius of the site. ATC will also perform a door-to-door search for water supply wells or other potential receptors located within 500 feet of the site. Wells discovered during the well survey will be plotted onto a site vicinity map and construction details for the wells, if available, will be included in the summary report.

Work described in this workplan will be performed under the direction of a California Registered Professional Engineer or Registered Geologist. Work will be performed in accordance with ATC's site-specific Health and Safety Plan (HASP) contained in Attachment 1 and Quality Control/Quality Assurance Plan contained in Attachment 2.

Report Preparation

Upon completion of the subsurface investigation activities, a summary report will be prepared and will include a description of field activities, boring logs, data presented in tabular form, isoconcentration maps depicting the estimated horizontal extent of petroleum impacted soil and groundwater.

Projected Schedule

Once approval of this workplan has been received, ATC will confirm a schedule for on-site Geoprobe® drilling activities. ATC will notify SCDER at least 48 hours prior to beginning any field activities. The summary report will be submitted to SCDER approximately three to four weeks after the completion of field activities.

If you have any questions or require additional information regarding this workplan, please contact us at (209) 579-2221.

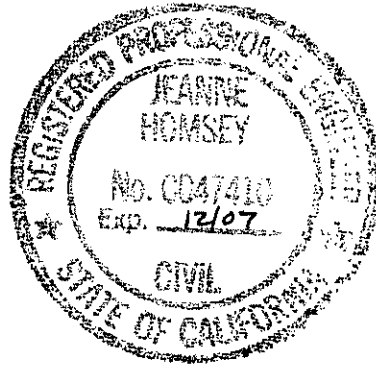
Respectfully submitted,
ATC Associates Inc.

Nathan Christman

Nathan Christman
Staff Geologist

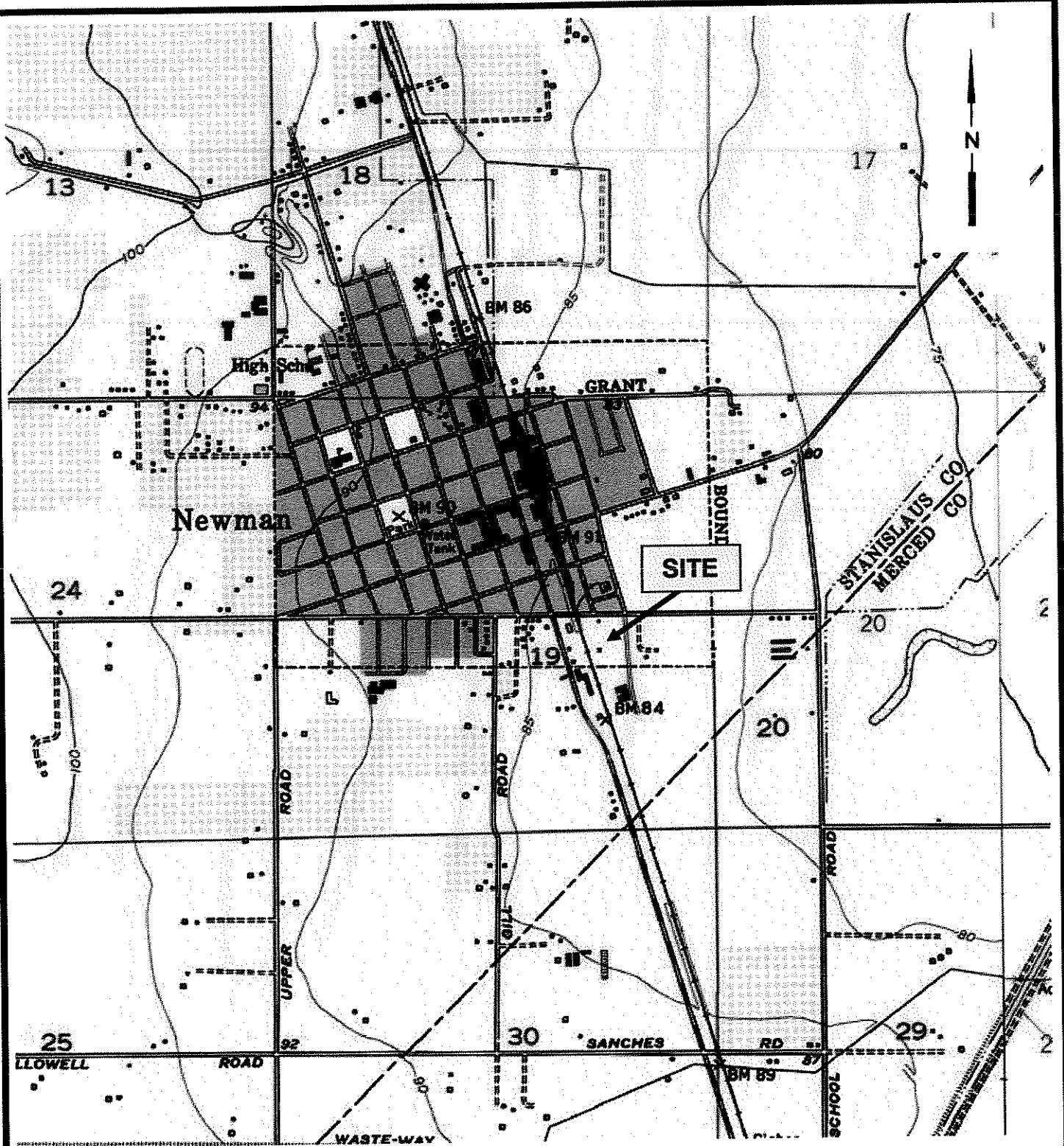
Jeanne Homsey

Jeanne Homsey, P.E.
CA Professional Engineer No. C47410



Attachments

cc: Mr. Chuck Betty
Mr. William Cerutti
Mr. Michael Smith, CVRWQCB



SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC MAP NEWMAN QUADRANGLE, CALIFORNIA, DATED 1952, PHOTOREVISED 1971, AND PHOTOINSPECTED 1978.



1117 Lone Palm Ave, Ste B
Modesto, CA 95351
(209) 579-2221

PROJECT NO: 54.24614.0001

DESIGNED BY: NC

SCALE: 1:24,000

REVIEWED BY: JH

DRAWN BY: NC

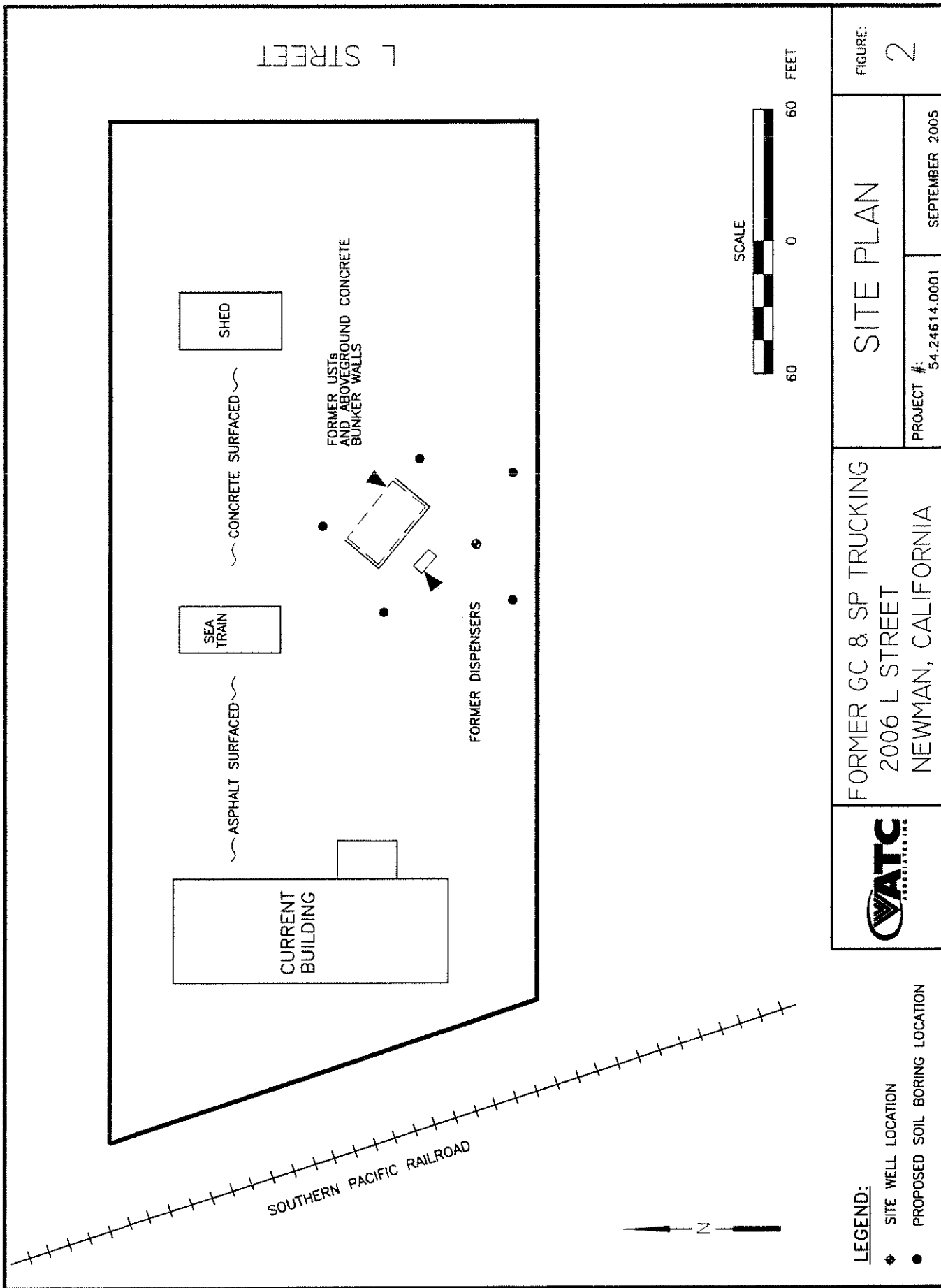
DATE: 09/05

FILE: LOCATION

FIGURE 1

SITE VICINTY MAP

FORMER GC & SP TRUCKING
2006 L STREET
NEWMAN, CALIFORNIA



LEGEND:

- ◆ SITE WELL LOCATION
- PROPOSED SOIL BORING LOCATION



FORMER GC & SP TRUCKING
2006 L STREET
NEWMAN, CALIFORNIA

SITE PLAN

PROJECT #:
54.24614.0001

SEPTEMBER 2005

FIGURE:
2

Attachment 1



Appendix 7-4
Form HS 003

ENVIRONMENTAL SITE SAFETY PLAN

Important: Please forward one copy of completed document to the reviewer three (3) working days prior to project start up and maintain a copy on site. Place signed copy in project file. Items marked with "1910.120..." are required by 29 CFR 1910.120 in the paragraph noted.

A. GENERAL INFORMATION (1910.120(c)(4))

Project Name Former GC&SP Trucking Project Number 54.24614.0001

Project Manager Jeanne Homsey
Print Signature

Site or Building Name _____

Address 2006 L Street

City, State & Zip Newman, CA 95360

Client Contact Name and Phone Number Chuck Betty
(209) 606-1493

Fire #: 911 Police #: 911 Ambulance #: 911

Nearest Hospital Name Emanuel Medical Center (209) 668-5234

Address 825 Delbon Avenue, Turlock, CA

Directions to Hospital See Map

Location of Nearest Phone Cell phone
(and special dialing instructions if any)

Directions for Emergency Escape NA
(attach diagram if necessary)

Designated Reporting Area NA
(after emergency occurrence)

B. SITE DESCRIPTION (1910.120(c)(4))

Facility History:

Facility has a known release of petroleum hydrocarbons. Detectable concentrations of diesel, toluene, ethylbenzene, and xylenes have been detected in soil beneath the site.

Type of Hazard Anticipated On Site (i.e. tanks, drums, etc.):

Petroleum hydrocarbon vapors expected in area. Fire hazard, inhalation, ingestion and contact hazards.

Amount of Hazardous Materials Present:

Maximum Soil Concentrations – Unknown

General Site Description:

Active welding shop.

C. PROJECT OBJECTIVE(S) (1910.120(b)(3))

(Description of work area activities planned:)

Advance five soil borings in the vicinity of the former USTs to a depth of 25 feet bgs. Soil samples will be collected continuously.

D. PROJECT ORGANIZATION (1910.120(b)(2))

<u>Team Member</u>	<u>Responsibility</u>	<u>Type of Training</u>	<u>Date of Training</u>
Nathan Chrisman	Geologist	40-hr Hazwoper/annual refresher	12/03

E. CHEMICAL HAZARD ANALYSIS (1910.120(b)(4))

Contaminant	IP	PEL/TLV	IDLH	LEL/UEL	Flash Point	Routes of Exposure
Gasoline	?	300 ppm	Not determined	1.4/7.6%	-45 F	Inhale, ingest, absorb, contact
Benzene	9.24eV	1 ppm	500ppm	1.2/7.8%	12 F	Inhale, ingest, absorb, contact
Ethylbenzene	8.76eV	100 ppm	800ppm	0.8/6.7%	55 F	Inhale, ingest, absorb, contact
Toluene	8.82eV	100 PPM	500ppm	1.1/7.1 %	40 F	Inhale, ingest, absorb, contact
Xylenes	8.56eV	100 ppm	900ppm	0.9/6.7%	90 F	Inhale, ingest, absorb, contact
MTBE		NA	NA	NA	-18.4F	Irritant to skin, eyes, nose, and throat; nausea, drowsiness, dizziness, vomiting.
TBA		NA	NA	NA		Irritant to skin, eyes, nose, and throat; nausea, drowsiness, dizziness, vomiting.

NOTE: Attach Material Safety Data Sheets for all substances identified above. Also see Section (M) (2).

F. OTHER HAZARDS

Heat Stress? ☐ Yes ☒ No If yes, please specify precautions to be taken:

Cold Stress? ☐ Yes ☒ No If yes, please specify precautions to be taken:

Excessive Noise? ☒ Yes ☐ No If yes, please specify precautions to be taken:

Wear ear plugs

Confined Space Entry? ☐ Yes ☒ No If yes, attach copy of Confined Space Entry Permit.

Excavations 4' or greater in depth? ☐ Yes ☒ No If yes, specify precautions to be taken:

Welding, Cutting & Brazing? ☐ Yes ☒ No If yes, specify precautions to be taken:

Heavy Equipment Operation? ☐ Yes ☒ No If yes, specify precautions to be taken:

Slip, Trip or Fall Hazards? ☒ Yes ☐ No If yes, specify precautions to be taken:

Cones, caution tape, and Duct tape to secure electrical cords. And other trip hazards.

Presence of Overhead Utilities

Are overhead utilities present at the project site? ☒ Yes ☐ No

If so, always maintain suitable clearance from overhead lines. Reference manual section 12.

Specify location: _____

Presence of Underground Utilities

Have underground utilities been located and marked at the site? ☒ Yes ☐ No ☐ NA

If yes, have the requirements of manual section 33 – Subsurface Investigations

☒ Yes ☐ No

been followed? (Attach completed Checklist for Subsurface Clearance - Appendix 33-1)

Name of Contact(s)	Underground Service Alert
Phone Number	1-800-642-2444

<u> x </u>	Temporary barricades and/or warning tape
<u> </u>	Security Fencing
<u> </u>	24 Hour Security
<u> </u>	Other (specify)

<u>Work Zone</u>	<u>Level of Protection</u>	<u>Required Protective Equipment</u> (specify exact type e.g. nitrile gloves)
Exclusion Zone	<u>Level D</u>	Respirator: <u>NA</u> Filters/Cartridges: <u>NA</u> Boots: <u>Steel toe</u> Inner Gloves: <u>nitrile</u> Outer Gloves: <u>leather</u> Protective Coverall: _____ Hard Hat: <u>yes</u> Eye Protection: <u>yes</u> Other: <u>Fire extinguisher</u>

Contamination _____
Reduction Zone

Respirator: NA

Filters/Cartridges: NA

Boots: Steel toe

Inner Gloves: NA

Outer Gloves: NA

Protective Coverall: NA

Hard Hat: NA

Eye Protection: NA

Other: _____

Exceptions and Modifications:

NA

I. DECONTAMINATION (1910.120(k))

Personnel Decontamination Procedures

All personnel entering the Exclusion Zone will undergo decontamination prior to leaving the site. Personnel will proceed through the following decontamination stations:

Decontamination Solution: NA

STATION #1: _____

Equipment Required: NA

STATION #2: NA

Equipment Required: _____

STATION #3: NA

Equipment Required: _____

STATION #4: NA

Equipment Required: _____

STATION #5: NA

Equipment Required: _____

Equipment Decontamination

Gross Removal By:

<u>x</u>	Hand Scrubbing
_____	Cold High Pressure Wash
_____	Hot High Pressure Wash
<u>X (rig)</u>	Steam Cleaning
<u>X</u>	Other (specify) _____
<u>X</u>	Clean Rinse
<u>X</u>	Decon solution (specify) <u>Alconox solution</u>

Decontamination Waste Water

Collection (specify how): _____ Decon water will be collected in 55-gallon drum, labeled, and stored on site.

Direct Discharge (specify how and where): NA

Pre-Treatment (specify): NA

Disposal (specify how and where): NA

J. AMBIENT AIR MONITORING (1910.120(b)(4))

<u>Activity & Contaminant</u>	<u>Instruments</u>	<u>Action Level</u>	<u>Frequency</u>
Half face respirator/Organic vapors	PID	20 ppm	Every 5 minutes
Evacuate site/Organic vapors	PID	>200 ppm	Every 5 minutes

Comments: **Benzene is not specifically monitored for with a OVM so any vapor reading at 20 ppm must require 1/2 face respirator.**

K. PERSONNEL AIR MONITORING (1910.120(h))

<u>Activity/Location</u>	<u>Contaminants(s)</u>	<u>NIOSH/OSHA Protocol</u>
NA		

L. CONTINGENCY PLAN (1910.120(l))

Emergency Communication Signal(s) (specify): Verbal communication

Emergency Escape Route(s) (specify and indicate on site diagram):

To be determined on-site
prior to beginning work
activities

Emergency Equipment On Site: (specify location):

First Aid Kit: Truck

Fire Extinguishers: Truck

Telephone: On person/truck

Eye Wash/Safety Shower: NA

Others (specify): NA

Re-entry to the Exclusion Zone following an on-site emergency shall not be permitted until the following conditions are satisfied:

- (1) The conditions resulting in an emergency have been corrected.
- (2) The hazards have been re-evaluated.
- (3) The HASP has been reviewed and determined adequate for the hazards encountered.
- (4) All site personnel have been instructed in any new hazards and changes to the HASP.

M. OTHER REQUIRED INFORMATION

In order to comply with OSHA standards, the following documents **MUST** be maintained on site:

- 1) Hazard Communication Manual (1910.1200)
- 2) Chemical List and Material Safety Data Sheets for all chemicals (1910.1200)
- 3) Respirator fit test records for all employees who will be required to wear respirators (1910.134)
- 4) Copy of ATC's Respirator Program (1910.134)
- 5) Latest medical summary for all personnel (1910.120)
- 6) Copy of OSHA 200 (300A) Log posted during months of February - April only

**** EMERGENCY PHONE NUMBERS ****

---- Post in Full View ----

ATC Director of Health and Safety (317) 849-4990 x1422
Chemtrec (800) 424-9300
DOT Hotline..... (202) 366-4488
Materials Transportation Bureau
Centers for Disease Control and Prevention..... (404) 633-5313
(Emergency Only)
Solid Waste and Emergency Response (202) 260-2180
Office of Emergency and Remedial Response
TSCA Assistance Information Services Hotline..... (202) 554-1404
Continuum Healthcare (ATC Medical Director)..... (800) 229-3674
-24 hour hotline

HOSPITAL: (Name): Emanuel Medical Center
(Address): 825 Delbon Avenue, Turlock, CA

(Phone): (209) 667-4200
(Travel Time): 33 minutes
(Directions): See Attached.

(Map Attached): Yes

PARAMEDICS: (Name): _____
(Phone): 911

FIRE DEPT: (Name): _____
(Phone): 911

LOCAL POLICE: (Name): _____
(Phone): 911

UTILITIES: (Electric): P.G. &E. 1-800-743-5000
(Gas): P.G. &E. 1-800-743-5000

All personnel have read the HASP and are familiar with its provisions. All personnel have received medical surveillance and training in compliance with the ATC Health and Safety Policy.

NAME

SIGNATURE

DATE[illegible]
















START **2006 L St**
Newman, CA 95360-9765,
US

END **Emanuel Medical Ctr:**
209-667-4200
825 Delbon Ave, Turlock,
CA 95382, US

Total Est. Time:
33 minutes

Total Est. Distance:
22.75 miles

Maneuvers	Distance
START 1: Start out going NORTH on L ST toward INYO AVE.	0.2 miles
 2: Turn RIGHT onto INYO AVE.	0.4 miles
 3: Turn LEFT onto CANAL SCHOOL RD.	0.3 miles
 4: Turn RIGHT onto HILLS FERRY RD.	2.9 miles
 5: HILLS FERRY RD becomes CR-J18.	0.7 miles
 6: Stay STRAIGHT to go onto KELLEY RD.	1.6 miles
 7: Turn LEFT onto TURNER RD.	0.2 miles
 8: TURNER RD becomes CENTRAL AVE.	3.2 miles
 9: Turn RIGHT onto W AUGUST RD.	1.3 miles
 10: W AUGUST RD becomes AUGUST AVE.	1.6 miles
 11: Turn LEFT onto WASHINGTON RD.	5.0 miles
 12: Turn RIGHT onto W MAIN ST / CR-J17.	2.9 miles
 13: Turn LEFT onto LANDER AVE / CR-J14 / CR-J17. Continue to follow CR-J14 / CR-J17.	0.2 miles
 14: Turn LEFT onto CA-99 BR / N GOLDEN STATE BLVD / CR-J14.	0.2 miles
15: Turn SLIGHT RIGHT onto GEER RD / CR-J14 N.	0.8 miles



16: Turn RIGHT onto NORTH AVE.

0.4 miles



17: Turn LEFT onto N OLIVE AVE.

<0.1 miles



18: Turn RIGHT onto DELBON AVE.

<0.1 miles

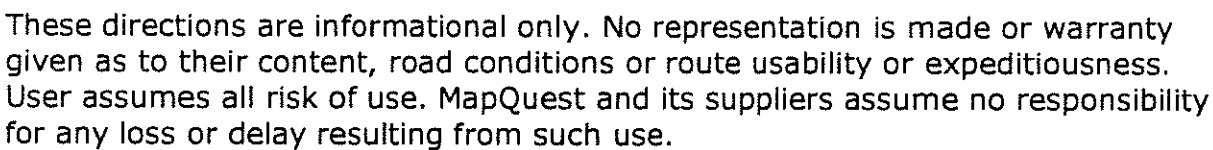


19: End at **Emanuel Medical Ctr**

825 Delbon Ave, Turlock, CA 95382, US

Total Est. Time: 33 minutes

Total Est. Distance: 22.75 miles



Attachment 2

**QUALITY ASSURANCE
QUALITY CONTROL PLAN**

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TABLES:

1. - Sample Containers, Holding Times and Preservation
2. - Laboratory Test Methodology Underground Tank Sites

QUALITY ASSURANCE QUALITY CONTROL PLAN

The Subsurface Investigation (SI) Quality Assurance/Quality Control (QA/QC) program is intended to facilitate the acquisition of accurate and reliable data. Environmental data gathered during the SI will be collected and analyzed following procedures prescribed in the Quality Control Program. A Quality Assurance Program has been established to assure that the Quality Control Program is effective. Both programs are necessary to provide accurate data and documentation for investigations and laboratory analyses. The following field and laboratory procedures will be implemented to ensure that QA/QC objectives are met.

1.0 RECORDING OF FIELD DATA

All information pertinent to the field investigation will be kept in a field log book. Information to be documented includes at least the following:

- ✓ Sample Numbers
- ✓ Locations of Sample Collection
- ✓ Soil Boring or Well Numbers, as applicable
- ✓ Depths at which Samples were Obtained
- ✓ Names of Collectors
- ✓ Dates and Times of Collection
- ✓ Purpose of Sample
- ✓ Sample Distribution (e.g., laboratory, archive, etc.)
- ✓ Field Observations
- ✓ Field Measurements (e.g., PID readings, pH, conductivity, well log, etc.)
- ✓ Other Data Records (e.g., development log, soil sampling report, well log, etc.)

2.0 SAMPLE CONTAINERS

Groundwater samples will be placed in containers supplied by the analytical laboratory. Table 1 summarizes the required sample containers.

Soil samples will be collected in either 8-ounce widemouth clear glass jars provided by the laboratory or in clean brass or stainless steel tubes (Table 1). Screw on caps will be fitted with teflon liners. Tubes will be tightly capped and sealed.

3.0 QUALITY CONTROL FIELD SAMPLES

A QC program independent from the laboratory's program will be instituted. The program entails "blind" submittals to the laboratory of blank and duplicate samples. No field spiked samples will be supplied for this investigation. The laboratory in-house QC program will include analysis of spiked samples. All QC samples will be assigned independent sample numbers and made indistinguishable from non-QC samples.

When sampling groundwater, travel blanks will be used to detect the introduction of contaminants during transportation from the field to the laboratory. The travel blanks will be provided by the analytical laboratory. They will be taken to the field and accompany the collected groundwater samples to the laboratory for analysis. The blanks will consist of deionized water and analytically confirmed organic-free water. The blank is numbered, packaged, and sealed in the same manner as the other samples.

Water sample duplicates will be created by filling two sample bottles from the well bailer. If more than one bailer volume is required, each bailer volume will be split between containers.

4.0 SAMPLE PRESERVATION

Sample containers will be pre-cooled and transported to the site in the cooler. All samples will be preserved as indicated on Table 1 and placed in a cooler immediately after collection. Chemical ice sealed in plastic bags will be used in the cooler to cool and maintain samples at a temperature of 4°C. Further discussion of sample preservation is included in the sampling protocols (Sections 11.0 and 12.0).

5.0 CHAIN-OF-CUSTODY PROCEDURES

5.1 Sample Labels

Each sample container will be labeled prior to filling to prevent misidentification. The label will contain at least the following information:

- ✓ sample number which uniquely identifies the sample
- ✓ project title or number
- ✓ location of sample collection
- ✓ soil boring or well number, as applicable
- ✓ name of collector
- ✓ date and time of collection
- ✓ type of analysis requested

5.2 Chain-of-Custody Record and Sample Analysis Request Form

A chain-of-custody record for each container or sample will be used to track possession of the samples from the time they were collected in the field until the time they are analyzed in the laboratory.

The chain-of-custody record will contain the following information:

- ✓ site name
- ✓ signature of collector
- ✓ date and time of collection
- ✓ sample identification number(s)
- ✓ number of containers in sample set
- ✓ description of sample and container(s)
- ✓ name and signature of persons, and the companies or agencies they represent, who are involved in the chain of possession
- ✓ inclusive dates and times of possession
- ✓ requested analysis for each sample

5.3 Delivery of Samples to Laboratory

Samples will be delivered to the laboratory on a daily basis. Samples will be refrigerated to approximately 4°C for shipping. If a courier is used the shipping containers will be sealed with security tape to assure sample integrity during shipping. Delivered samples will be accompanied by a chain-of-custody record. The laboratory shall note on the chain-of-custody that samples were properly preserved and security tape was intact upon arrival.

6.0 SAMPLING AND DRILLING EQUIPMENT DECONTAMINATION

All equipment used for drilling and sampling will be decontaminated prior to use. All equipment used for collection of more than one sample, such as bailers and spoons, will be decontaminated between each use to prevent cross contamination between samples. Drilling equipment will be decontaminated prior to commencing drilling at each hole. Well construction materials will be cleaned as necessary, prior to installation.

Equipment and well material decontamination will be conducted on an impermeable surface and all decontamination effluent will be contained. All surfaces of the equipment will be thoroughly decontaminated using a steam cleaner. The equipment will be placed on a drying rack for air drying. The decontamination water will be stored in containers certified for hazardous materials storage and disposed of in an approved manner.

Sample equipment to be used for pesticides and organic analysis will be washed in a nonphosphate detergent (Alconox or equivalent) and rinsed with tap water, followed by deionized water. If the equipment is for metals analysis, the initial rinse will be conducted with 0.1 N nitric acid followed by tap water and deionized water.

7.0 FIELD EQUIPMENT CALIBRATION AND MAINTENANCE

The following measuring equipment may be used during the Remedial Investigation. Equipment is grouped by field activity. Calibration procedures and frequency are listed by piece.

Soil Borings and Well Dimensions

Steel and coated cloth tape. Calibration: none.

Water Level Measurements in Wells

Steel surveyors tape. Calibration: manufacturer supplied temperature correction will be applied as applicable for field conditions. Electrical well sounders. Calibration: check against steel surveyor's tape.

Organic Vapors

Photoionization Detector (PID). Calibration: daily field calibration using a isobutylene standard as per manufacturers instructions.

Groundwater pH Measurement

Digital pH meter. Calibration: standard pH solutions of 4, 7, and 10 will be utilized for daily field calibration according to manufacturers instructions.

Electrical Conductivity

Electrical Conductivity meter. Calibration: factory-calibrated annually and periodically calibrated against laboratory prepared standard calibration solution.

Water Temperature

Mercury or digital thermometers. Calibration: factory calibrated once.

Combustible Gas/Oxygen

Combustible gas/oxygen meter. Calibration: factory calibrated, field calibrated monthly, zeroed daily according to manufacturers instructions.

Miscellaneous Measuring Devices

Calibration procedures for any other measuring device used will be documented at the request of the regulatory authority.

All equipment will be checked daily and replaced as necessary. Instrument manuals and an instrument log book will accompany equipment into the field. Any calibration, repairs or related information will be recorded in the log book.

8.0 LABORATORY QA/QC PLAN

Soil and groundwater samples will be submitted to a State Certified Hazardous Waste Laboratory for chemical analysis of hazardous constituents. Established QA/QC procedures for analytical operations will include sample custody procedures, standards of analytical accuracy, analysis of matrix spikes and method blanks, data reduction, verification of raw analytical data, and maintenance of control charts to monitor analytical performance. These QA/QC procedures are outlined in the laboratory QA/QC Plan which is available upon request. Organic chemical analyses will be performed in conformance with standard procedures established by the United States Environmental Protection Agency (EPA) in "*Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act*" (40 CFR, Part 136, October 1984). The laboratory is periodically evaluated through external performance audits conducted by EPA and DHS using QC labs. The specific analytical methods to be utilized for purgeable and semivolatile hydrocarbons analyses are shown on Table 2.

Provided the database is of sufficient size, statistical techniques may be employed for data validation.

9.0 GROUNDWATER MONITORING PROTOCOL

Monitoring of depth to water and free product thickness within wells at the site will be conducted using an Interface Probe or Conductivity Meter. For consistency, all measurements will be taken from the north side of the wellhead at the survey mark. To assess potential infiltration of fine-grained sediments, total well depth will also be sounded.

Product thickness is calculated by subtracting the depth to product from the depth to water. In addition, water elevations are adjusted for the presence of fuel with the following calculation:

$$(Product\ Thickness) (.8) + (Water\ Elevation) = Corrected\ Water\ Elevation$$

NOTE: The factor of 0.8 accounts for the density difference between water and petroleum hydrocarbons.

Newly installed wells will be allowed to stabilize for 24 hours after development prior to free product inspection.

An acrylic Surface Sampler will be used for visual inspection of the groundwater in order to note sheens (difficult to detect with the Interface Probe), odors, microbial action and sediments. The sampler is calibrated in inches and centimeters for visual inspection of product thickness.

To reduce the potential for cross contamination between wells, the monitorings will take place in order from the least to most contaminated, if known. Wells containing free product will be monitored last. Between each well monitoring the equipment will be decontaminated.

Water level data collected from the wells will be used to develop a groundwater contour map for the project site. Groundwater flow will be estimated to be perpendicular to equipotential lines drawn on the map.

10.0 WELL DEVELOPMENT PROTOCOL

Groundwater monitoring wells will be surged and developed prior to setting the surface seal. Approximately 10 times the volume of water in the casing will be withdrawn if possible. Casing volumes will be calculated in the following manner:

VOLUME OF SCHEDULE 40 PVC PIPE		
Diameter (inches)	I.D. (inches)	Volume Gal/linear feet
2	2.067	0.17
4	4.026	0.66

VOLUME OF OPEN BOREHOLE AND ANNULAR SPACE BETWEEN CASING AND HOLE					
Hole Diameter (inches)	Volume/Linear Feet of Hole		Nominal Casing Diameter (inches)	Volume/Linear Feet of Annular Space ¹	
	Gallons	Cubic Feet		Gallons	Cubic Feet
7.25	2.14	0.29	2	1.91	0.26
8.25	2.78	0.37	2	2.55	0.34
10.25	4.29	0.57	2	4.06	0.54
10.25	4.29	0.57	4	3.46	0.46
12.25	6.13	0.82	4	5.30	0.71

¹ Annular volumes will be multiplied by 30% to account for porosity of filter pack.

If the aquifer is slow to recharge, development will continue until recharge is too slow to practically continue. The volume of water produced versus time will be recorded.

All withdrawn groundwater will be stored on-site in 55-gallon waste drums unless permission is granted by the appropriate regulatory agency to discharge the water to the ground surface or sanitary sewer. Drummed water will be labeled with the source of the water to help ensure appropriate disposal based on contamination levels.

11.0 SOIL SAMPLING PROTOCOL

11.1 Sample Collection During Drilling Activities

A proposal will be submitted to the lead regulatory authority with proposed boring/sampling locations. The exact location and number of borings at each site will be determined in the field by the Project Geologist/Engineer.

Prior to arriving at the sample site, the drill rig/augers will be steam cleaned and all sample equipment will be cleaned. Cleaning will be conducted on-site on all sampling equipment between each sample interval.

For hollow-stem auger drilling methods, soil samples will be obtained using a California modified split-spoon sampler containing three 6-inch long, 2-inch diameter brass tubes. The sampler will be driven 18-inches ahead of the hollow stem auger by a 140-pound hammer with a 30-inch drop in accordance with American Society for Testing and Materials (ASTM) Methods D 1586-84 for split barrel sampling of soil and D 1587-83 for thin-walled tube sampling of soils. The blows required to drive the sampler each 6-inch interval will be recorded on the boring log. The sampler will be removed from the boring and opened to reveal the brass tubes. The bottom tube will be sealed with aluminum foil or teflon tape and plastic end caps, taped and labeled with the following information:

- ✓ date and time
- ✓ project ID
- ✓ sample ID
- ✓ name of sampler
- ✓ type of analysis to be performed

This sample will be immediately placed into a cooler containing dry ice or frozen chemical ice. The samples will be delivered to a state certified laboratory following under chain-of-custody protocol within 48 hours of sampling, whenever possible.

Soil in the uppermost brass tube will be described according to ASTM standard practice for description and identification of soils (ASTM D-2488-84). Stratigraphic, genetic and other data/interpretations will also be recorded. Soil properties may also be determined from the middle brass tube and from the sampler shoe. Alternatively the second sample tube may be used with the uppermost tube for preparation of duplicates. These field observations will be noted on a log prepared for each boring/well.

During sampling, latex or nitrile gloves will be worn to prevent cross-contamination with other samples. The disposable gloves will be discarded after collecting samples from each 18-inch sample drive.

Soil samples will be collected at approximately 5-foot intervals, at significant changes in lithology and intervals of obvious contamination in order to develop a complete profile of soil contamination.

11.2 Sample Collection During Tank Removal

parameters have stabilized, a sample will be collected after the water level approaches 80 percent of its initial elevation. Where water level recovery is slow, the sample will be collected after stabilization is achieved and enough water is present to fill sample containers.

Cross contamination from transferring pumps (or bailers) from well to well will be avoided by utilizing dedicated equipment. Where this is not feasible, thorough cleaning of equipment will be performed between sampling rounds. Sampling will proceed from the least contaminated to the most contaminated well, if information is available before sample collection, or if it is indicated by field evidence. Where several types of analysis will be performed for a given well, individual samples will be collected in the following order:

1. Volatile Organics
2. Purgeable Organic Carbon
3. Purgeable Organic Halogens
4. Total Organic Carbon
5. Total Organic Halogens
6. Extractable Organics
7. Total Metals
8. Dissolved Metals
9. Phenols
10. Cyanide

The specific analytical methods be utilized for the common volatile/semivolatile to analyses are shown on Table 2.

Groundwater samples will be collected with a teflon bailer with bottom emptying device. Duplicate samples will be transferred to vials or containers that meet Regional Board specifications. Groundwater from the bailer will be transferred to the sample container by allowing the fluid to flow slowly along the sides of the vessel. All containers will be filled above

the top of the opening to form a positive meniscus. No headspace should be present in the sample container once it is sealed. After the vial is capped it will be inverted to check for air bubbles. If bubbles are present the sample will be discarded and replaced. If it is not possible to collect a sample without headspace, the problem will be noted on the field technician's sampling log.

Immediately following sample collection, samples will be labeled and stored in an ice chest containing frozen chemical ice sealed in plastic bags. Sample labels will contain the following information:

- ✓ date and time
- ✓ project ID
- ✓ sample ID
- ✓ name of sampler
- ✓ type of analysis to be performed

All samples will be transported under chain-of-custody protocol to a state certified laboratory within 24 hours. A sample container filled in the laboratory with organic free water and carried unopened during the sampling trip will also be provided (Trip Blank). A "high-low" temperature recording thermometer will also accompany sample shipments to ensure proper sample temperature maintenance.

Samples will be transported either by ATC Associates Inc. personnel or by private carrier. Analytical holding times will be considered in determining sampling and shipping schedules. Friday shipment/Saturday laboratory receipt of samples will be coordinated in advance with the laboratory.

TABLE 1

**SAMPLE CONTAINERS, HOLDING TIMES
AND PRESERVATION**

PARAMETER	MATRIX	CONTAINER	HOLDING TIME	PRESERVATION
TPH (Light Fractions) (Heavy Fractions)	Soil	3" stainless steel or brass cylinder	14 days ¹ 40 days ²	4°C
	Water	40 ml glass vial, teflon-faced silicon septum	14 days ¹	4°C HCl to pH <2
	Water	1 L amber bottles, teflon seal/silicon septum	14 days ¹ 40 days ²	4°C
BTEX	Soil	3" stainless steel or brass cylinder	14 days ¹	4°C
	Water	2-40 ml glass vial, teflon seal/silicon	14 days ¹	4°C HCl to pH <2
Purgeable Halocarbons	Soil	3" stainless steel or brass cylinder	14 days ¹	4°C
	Water	2-40 ml glass vial, teflon seal/silicon septum	14 days ¹	4°C
Organic Lead	Soil	3" stainless steel or brass cylinder	14 days ¹	4°C
	Water	1 L amber bottles, teflon seal/silicon septum	14 days ¹	4°C
Ethylene Dibromide	Soil	3" stainless steel or brass cylinder	14 days ²	4°C
	Water	2-40 ml glass vial, teflon seal/silicon septum	14 days ¹	4°C
Polynuclear Aromatic Hydrocarbons	Soil	8 oz. wide mouth glass with teflon seal	14 days ¹ 40 days ²	4°C
	Water	1000 ml amber glass with teflon seal	7 days ¹ 40 days ²	4°C
Polychlorinated Biphenyls	Soil	8 oz. wide mouth glass with teflon seal	7 days ¹ 40 days ²	4°C
	Water	1000 ml amber glass with teflon seal	7 days ¹ 40 days ²	4°C
Total Metals	Soil	3" stainless steel or brass cylinder	6 months	4°C
	Water	1000 ml plastic	6 months	4°C, HNO ₃ to pH<2
Dissolved Metals	Water	1000 ml plastic	6 months	4°C, HNO ₃ to pH<2, 0.45 Micron Filtration
Pesticides	Soil	3" stainless steel or brass cylinder	40 days ²	4°C
	Water	1 L glass	40 days ²	4°C

- ¹ = Maximum holding time for sample (extract within this time or analyze if extraction is not required).
² = Maximum holding time for extract (analyze within this time).
³ = Maximum holding time for sample when pH adjusted with HCl.

TABLE 2

**LABORATORY TEST METHODOLOGY
UNDERGROUND TANK SITES**

HYDROCARBON LEAK	SOIL ANALYSIS		WATER ANALYSIS	
Unknown Fuel	TPHg	GCFID (5030)	TPHG	GCFID (5030)
	TPHd	GCFID (3550)	TPHD	GCFID (3510)
	BTEX	8020 or 8240	BTEX	602 or 624
Leaded Gas	TPHG	GCFID (5030)	TPHG	GCFID (5030)
	BTEX	8020 or 8240	BTEX	602 or 624
	TEL	DHS LUFT	TEL	DHS LUFT
	EDB	DHS - AB1803	EDB	DHS AB1803
Unleaded Gas	TPHG	GCFID (5030)	TPHG	GCFID (5030)
	BTEX	8020 or 8240	BTEX	602 or 624
Diesel	TPHD	GCFID (3550)	TPHD	GCFID (3510)
	BTEX	8020 or 8240	BTEX	602 or 624
Jet Fuel	TPHD	GCFID (3550)	TPHD	GCFID (3510)
	BTEX	8020 or 8240	BTEX	602 or 624
Kerosene	TPHD	GCFID (3550)	TPHD	GCFID (3510)
	BTEX	8020 or 8240	BTEX	602 or 624
Fuel Oil	TPHD	GCFID (3550)	TPHD	GCFID (3510)
	BTEX	8020 or 8240	BTEX	602 or 624
Chlorinated Solvents	CL HC	8010 or 8240	CL HC	601 or 624
	BTEX	8020 or 8240	BTEX	602 or 624
Non Chlorinated Solvents	TPHD	GCFID (3550)	TPHD	GCFID (3510)
	BTEX	8020 or 8240	BTEX	602 or 624
Waste Oil or Unknown	TPHG	GCFID (5030)	TPHG	GCFID (5030)
	TPHD	GCFID (3550)	TPHD	GCFID (3510)
	O&G	1664	O&G	1664
	BTEX	8020 or 8240	BTEX	602 or 624
	CL HC	8010 or 8240	CL HC	601 or 624

NOTES:

ICAP or AA to Detect Metals: Cd, Cr, Pb, Zn

Method 8270 for Soil or Water to Detect:

PCB*	PCB*
PCP*	PCP*
PNA	PNA
Creosote	Creosote

*If found, analyze for dibenzofurans (PCBs) or dioxins (PCP)